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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,778	10/11/2001	Luc Ouellet	12251-US	7550

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EXAMINER

HOFFMANN, JOHN M

ART UNIT	PAPER NUMBER
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1731

DATE MAILED: 01/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/973,778

Applicant(s)

OUELLET ET AL.

Examiner

John Hoffmann

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 October 2005 and 25 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4-19,24 and 25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-19,24 and 25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 26 July 2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3 October 2005 has been entered.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4-19 and 24-25 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 has no step "a)" thus it is unclear how the first step i) relates to the other steps i).

Claim 1 is confusing as to how "front" and "back" relate to "under" (step i). Usually – front & back relate to a horizontal direction and "under" refers to a vertical direction. To look at it another way, if Applicant's figure 18c had the wafer oriented vertically – so as to have a front and a back, the layer 32 would not be "under" anything else. This makes it unclear as to whether claim 1 is directed to the arrangement shown

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in figure 18c, or if it requires that the nitride layer 32 is buried “under” layer 14 so that it is between layer 14 and the wafer. To look at it another way: one could have a sliver of wood “under” one’s skin – regardless as to whether the skin is facing up, down, left or right. Since the specification does not describe what is meant by “under” one would not be able to ascertain what is covered by the claim.

Still further, page 40 [00162] indicates that both nitride layers are on each “face” of the wafer in figure 18g. But nitride layer 16 is clearly NOT on the face of the wafer 10 (as shown in the drawings). There appears to be an error in either page 40 or the drawing. Since one would not be able to easily see where the nitride layer is, one would not be able to turn to the specification to determine what the claim really covers.

There are numerous antecedent issues that make the claims indefinite. As **examples:** claims 24 and 25 seem to refer to the same layers that were already deposited; claim 8 refers to “said stabilization temperature” – but claim 1 seems to suggest that there are two stabilization temperatures – thus it is unclear if claim 1 requires that the two temperatures be identical or not; claim 12 refers to the temperature of step b(ii) – but b(ii) has no mention of any temperature’ step b(v) refers to the “constant temperature of at least 800C” but there is no prior mention of such, the closest is the temperature that is between 800-1300; and step c) the buffer layer is not on the front face of the wafer – rather the nitride layer is on “said front face”. To the degree that the buffer is on a front face, it is NOT the same previously mention “front

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face" – it would be a new front face. This list is NOT exhaustive, the burden is on Applicant to fix the above problems and find and fix all other problems.

### ***Claim Rejections - 35 USC § 103***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 4-19 and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tregoat 6584807 in view of, Liu 5094984 and Ojha 5979188, and optionally in view of MAEDA 5679165

Tregoat teaches using PECVD (col. 1, line 65) to create an optical waveguide. As per, col. 6, lines 10-13, and col. 1, lines 66-67 along with the rest of the disclosure, teaches first nitride later on the front face and the first buffer layer (as per the first claimed fabricating step). But Tregoat does not disclose the layers on the back face.

Ojha '188 teaches it is known to have a stress compensating layer on the back (col. 3, line 62 to col. 4, line 3 – and to use the same material. It would have been obvious to add a stress compensating layer on the back so as to prevent bowing as taught by Ojha. As to using silicon nitride: Liu discloses that in the PECVD – Si wafer art is known to cap products in silicon nitride so as to insulate devices from the environment : col. 1, lines 16-22, col. 11, lines 17-26 and 48-58. It would have been obvious to apply a final silicon nitride layer on all surfaces of Tregoat device so as to insulate it from the environment as taught by Liu.

As to the first thermal treatment - step b) Tregoat does not disclose such treatments. However, as per Ojha' 188, col. 1, lines 9-27 indicates that such PECVD layer "requires consolidation...by an annealing process". It would have been obvious to include an annealing step in the Tregoat process, because such is required.

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From col. 1, lines 34-40 of Ojha '188 – it is known to prevent cracking by using long annealing times (and that such times were needed) – COL. 4, line 23 indicates tens of hours. Col. 4, lines 28-29 indicates anneal can also be done in a matter of minutes. Col 4, lines 4-5 indicates the time and temperatures depend on dopant concentrations. It would have been obvious to perform routine experimentation to determine the optimal temperatures for the annealing step – depending upon the structure actually made.

As to the use of a tube: the shape of a furnace would have been obvious depending upon what shapes of furnaces are available. **From MPEP 2144.04**

**B. Changes in Shape**

In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) (The court held that the configuration of the claimed disposable plastic nursing container was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.).

As to the furnace being stabilized at a temperature. It is noted that continuous and batch processes are usually obvious in view of each other.

**From MPEP 2144.04**

**E. Making Continuous**

In re Dilnot, 319 F.2d 188, 138 USPQ 248 (CCPA 1963) (Claim directed to a method of producing a cementitious structure wherein a stable air foam is introduced into a slurry of cementitious material differed from the prior art only in requiring the addition of the foam to be continuous. The court held the claimed continuous operation would have been obvious in light of the batch process of the prior art.).

Thus it would be obvious to have a furnace that has a stable temperature profile, and then pass the wafers through continuously to achieve their desired temperatures.

Examiner takes Official Notice that it is well known that continuous CVD furnaces have

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substantially constant/stable temperatures, as the wafers are fed the furnace sequentially, they are heated to the stable temperature in any given zone.

Maeda is optionally cited to show that it is known to perform CVD processing by both batch processes or continuous processes (col. 1, lines 13-20).

Steps c and e are clearly met.

Step d) Col. 2, lines 17-20 of Ojha teaches annealing only the buffer layer – which would necessarily require that the core is not deposited until after the buffer heat treatment step b). Thus one would repeat the annealing process for each layer – including the core and upper layers.

As to the various b) and d) limitations of decreasing stress, elastic deformation, etc. it is deemed that such would have be an inherent result because Ojha does the same thing that Applicant does.

Claims 4-5: it would have been obvious to have the device at whatever temperature one desires for as long as one desires prior to the beginning of the real process – because it does not matter to the processing.

Claims 6-7, 13, 19: Ojha does not disclose the claimed ramping rate. However, col. 2, lines 5-10, disclose that the times and temperatures “critical” and that they depend on the compositions. It would have been obvious to perform routine experimentation to determine all the optimal times and temperatures for the annealing



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(including the duration of the ramp-up which inherently determines the rate of ramp-up) because they are critical for having low loss. Clearly if one decided to use a glass composition that has lower melting/softening/annealing point, one would end up using lower processing temperatures.

Claim 12 and 18 are clearly met.

Ojha does not teach the PECVD temperature (i.e. the first predetermined temperature that the wafer is prior to the heating for annealing). Col. 7, lines 29-31 of Liu discloses that the preferred temperature for PECVD is 300-450: it would have been an obvious matter of design choice and/or routine experimentation to use a temperature about 400 C, since this is what is preferred. Thus the substrate would be around 400 degrees prior to the annealing. It would have been obvious to have it and keep it at such a temperature for as long as necessary prior to transferring it to the annealing process. One would not want to cool it down because it would just take extra energy to just heat it up again. (This applies to claims 4-5 and 8-9)

Claims 10-11: it would have been obvious to ramp at what ever rate is most convenient.

Claims 14-15: Liu teaches using nitrogen. It would have been obvious to use nitrogen because it is inexpensive and inert. One would not want to use air or other gases that would/might be reactive with the substrate/waveguide.

Claim 16: if there is any nitrogen, it would have been obvious to have it constant for at least part of the process, so as to keep all the parameters constant. If one changes the flow rate, the heat flow would inherently change, requiring changing the energy input, etc.

Claim 17: it would have been obvious to use whatever appropriate flow rate works, depending upon the size of the substrate. Many large substrates would require more of a flow rate than a single small substrate.

Claims 24-25 are clearly met.

### ***Response to Arguments***

Applicant's arguments filed 3 October 2005 have been fully considered but they are not persuasive.

It is argued that the prior art does not disclose nitride layers. Previously cited references Liu and Henry - as well as newly cited Tregoat - show that it was well known to provide silicon nitride barrier layers. There is nothing in the record that applicant's invention does anything beyond providing conventional nitride barriers for conventional reasons.

It is also argued that the prior art does not teach using diffusion tubes at elevated stabilized temperatures. Examiner could not find anything in the record that shows any importance to the use of tubes or having the apparatus at a starting temperature. It

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appears that it is routine choice of a furnace shape and using obvious routine experimentation to determine the optimal temperatures.

As per MPEP 2144.05

**2144.05 [R-1] Obviousness of Ranges**

**II. OPTIMIZATION OF RANGES**

**A. Optimization Within Prior Art Conditions or Through Routine Experimentation**

Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)


Examiner sees nothing which suggest the claimed temperatures have any criticality.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Hoffmann whose telephone number is (571) 272 1191. The examiner can normally be reached on Monday through Friday, 7:00- 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John Hoffmann  
Primary Examiner  
Art Unit 1731

1-12-06

jmh